

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Previously presented) A diffusion layer for a fuel cell comprising a base layer impregnated with a binder for structural reinforcement, and a water-repellent layer with a multi-layer structure including an inner layer and an outer layer different in adhesiveness and strength to each other.
2. (Withdrawn) A method for manufacturing a diffusion layer including at least a base layer for a fuel cell comprising the steps of:
providing said base layer,
wherein said base layer only is increased in strength during providing the base layer.
3. (Withdrawn) An apparatus for manufacturing a diffusion layer including at least a base layer for a fuel cell comprising:
a device for providing a base layer,
wherein said base layer only is increased in strength.
4. (Currently amended) A diffusion layer for a fuel cell comprising:
a base layer; and
a water-repellent layer coated on said base layer, said water-repellent layer including a filament, into which synthetic resin is deformed, as a structural reinforcement element.
5. (Canceled)

6. (Withdrawn) A method for manufacturing a diffusion layer for a fuel cell comprising the steps of:
 - providing a base layer; and
 - coating a water-repellent layer on said base layer,
wherein only either one of said base layer and said water-repellent layer is increased in strength during a respective one of said base layer providing step and said water-repellent layer coating step.
7. (Withdrawn) A method for according to claim 6, wherein said water-repellent layer only is increased in strength during said water-repellent layer coating step.
8. (Withdrawn) An apparatus for manufacturing a diffusion layer for a fuel cell comprising:
 - a first device for providing a base layer; and
 - a second device for coating a water-repellent layer on said base layer,
wherein only either one of said base layer and said water-repellent layer is increased in strength by a respective one of said first device and said second device.
9. (Withdrawn) An apparatus according to claim 8, wherein said water-repellent layer only is increased in strength by said second device.
10. (Previously presented) A diffusion layer for a fuel cell comprising:
 - a base layer,
 - said base layer including: (a) a carbonized yarn of a woven fabric, (b) a carbonized binder impregnated into the yarn thereby connecting filaments of the yarn and (c) a water-repellent layer with a multi-layer structure including an inner layer and an outer layer different in adhesiveness and strength to each other.
11. (Withdrawn) A method for manufacturing a diffusion layer for a fuel cell comprising the steps of:

impregnating a base layer constructed of a woven fabric with a synthetic resin binder; and

carbonizing said base layer and said binder impregnated into said base layer.

12. (Withdrawn) An apparatus for manufacturing a diffusion layer for a fuel cell comprising:

a binder impregnation treatment container for containing a dissolved binder to be impregnated into a base layer constructed of a woven fabric; and

a carbonizing furnace for carbonizing the base layer and the binder impregnated into the base layer.

13. (Original) A diffusion layer for a fuel cell comprising:

a base layer,

said base layer including: (a) a carbonized yarn constructed of a woven fabric, and (b) a conductive synthetic resin binder impregnated into the carbonized yarn thereby connecting filaments of the yarn, said binder being solidified and non-carbonized.

14. (Withdrawn) A method for manufacturing a diffusion layer for a fuel cell comprising the steps of:

carbonizing a base layer constructed of a woven fabric;

impregnating the carbonized base layer with a conductive synthetic resin binder;

and

solidifying said conductive synthetic resin binder impregnated into said base layer.

15. (Withdrawn) An apparatus for manufacturing a diffusion layer for a fuel cell comprising:

a carbonizing furnace for carbonizing a base layer constructed of a woven fabric;

a binder impregnation treatment container for containing a dissolved conductive synthetic resin binder to be impregnated into said carbonized base layer; and

a furnace for solidifying said binder.

16. (Original) A diffusion layer for a fuel cell comprising:
a base layer having a water-repellent characteristic,
said base layer including: (a) a carbonized yarn constructed of a woven fabric,
and (b) a non-conductive synthetic resin binder impregnated into the carbonized yarn
thereby connecting filaments of the yarn, said binder being solidified and non-
carbonized.

17. (Withdrawn) A method for manufacturing a diffusion layer for a fuel cell
comprising the steps of:

carbonizing a base layer constructed of a woven fabric;
impregnating the carbonized base layer with a non-conductive synthetic resin
binder selected from a group consisting of fluororesin and silicone resin; and
solidifying said non-conductive synthetic resin binder impregnated into said base
layer.

18. (Withdrawn) An apparatus for manufacturing a diffusion layer for a fuel cell
comprising:

a carbonizing furnace for a base layer constructed of a woven fabric;
a binder impregnation treatment container for containing a dissolved non-
conductive synthetic resin binder to be impregnated into the carbonized base layer; and
a furnace for solidifying the binder.

19. (Currently amended) A diffusion layer for a fuel cell comprising:
a base layer,
said base layer including: (a) a non-woven carbon paper made from carbon
fibers, and (b) a synthetic carbonized resin binder impregnated into the carbon paper
with a nonuniform distribution in an impregnation amount in an in-plane direction of the
carbon paper, wherein

a first portion of said base layer including a relatively large amount of the binder is impregnated constructing a rigid portion of said base layer and a second portion of said base layer including a relatively small amount of the binder is impregnated constructing a deformable portion of said base layer.

20. (Withdrawn) A method for manufacturing a diffusion layer for a fuel cell comprising the steps of:

impregnating a base layer of a non-woven carbon paper made from carbon fibers in a wet condition with a synthetic resin binder so that said binder has a nonuniform distribution in an impregnation amount; and

carbonizing said binder impregnated into said base layer.

21. (Withdrawn) An apparatus for manufacturing a diffusion layer for a fuel cell comprising:

a synthetic resin binder impregnating device for impregnating a base layer of a non-woven carbon paper made from carbon fibers in a wet condition with a synthetic resin binder so that said binder has a nonuniform distribution in an impregnation amount; and

a carbonizing furnace for carbonizing said binder impregnated into said base layer.

22. (Canceled)

23. (Withdrawn) A method for manufacturing a diffusion layer for a fuel cell comprising the steps of:

impregnating a non-woven base layer made in a dry condition with a synthetic resin binder;

pressing said base layer impregnated with said synthetic resin binder; and

carbonizing completely said base layer and said synthetic resin binder impregnated into said base layer.

24. (Withdrawn) An apparatus for manufacturing a diffusion layer for a fuel cell comprising:

a synthetic resin binder impregnating device for impregnating a non-woven base layer made in a dry condition with a synthetic resin binder;

a press device for pressing said base layer impregnated with said synthetic resin binder; and

a carbonizing furnace for completely carbonizing said base layer and said synthetic resin binder impregnated into said base layer.

25. (Original) A diffusion layer for a fuel cell comprising:

a base layer having opposite surfaces; and

a water-repellent layer made from a mixture of carbon and synthetic resin formed on one surface of said base layer, said water-repellent layer being constructed of a multi-layer structure including an inner layer and an outer layer different in adhesiveness and strength to each other, said inner layer having a strength greater than a strength of said outer layer, said outer layer having an adhesiveness stronger than an adhesiveness of said inner layer.

26. (Withdrawn) A method for manufacturing a diffusion layer for a fuel cell comprising the steps of:

repeating a plurality of times a process comprising the steps of:

coating a layer made from a mixture of carbon and synthetic resin; and

solidifying said layer, a solidifying condition being different between respective processes.

27. (Withdrawn) The method according to claim 26, further comprising the steps of:

coating a first water-repellent layer made from a mixture of carbon and synthetic resin on a carbon base layer and then solidifying said first water-repellent layer at a first temperature higher than a melting temperature of said synthetic resin; and

coating a second water-repellent layer made from a mixture of said carbon and said synthetic resin on said first water-repellent layer and then solidifying said second water-repellent layer at a second temperature near said melting temperature of said synthetic resin.

28. (Withdrawn) An apparatus for manufacturing a diffusion layer for a fuel cell comprising:

a furnace for solidifying a first water-repellent layer made from a mixture of carbon and synthetic resin coated on a carbon base layer at a first temperature higher than a melting temperature of said synthetic resin and for solidifying a second water-repellent layer made from a mixture of said carbon and said synthetic resin coated on said first water-repellent layer at a second temperature near said melting temperature of said synthetic resin.

29. (Previously presented) A diffusion layer for a fuel cell comprising:

a water-repellent layer including two kinds of binders, wherein said two kinds of binders include a first binder made from a synthetic resin having an adhesiveness and a second binder made from material having a higher rigidness than said synthetic resin of said first binder.

30. (Canceled)

31. (Withdrawn) A method for manufacturing a water-repellent layer of a diffusion layer for a fuel cell comprising the steps of:

coating a mixture of carbon and two kinds of binders dissolved in solvent on a base layer of said diffusion layer; and
solidifying said mixture coated on said base layer at a temperature near a melting temperature of one of said binders.

32. (Withdrawn) The method according to claim 31, wherein the coating step further comprises:

coating said mixture including said two kinds of binders on said base layer of said diffusion layer, said two kinds of binders including a first binder made from a synthetic resin having an adhesiveness and a second binder made from material having a greater rigidness than said first binder;
and the solidifying step further comprises:

solidifying said mixture coated on said base layer at a temperature near a melting temperature of said first binder.

33. (Withdrawn) An apparatus for manufacturing a diffusion layer for a fuel cell comprising:

a furnace for solidifying a water-repellent layer made from a mixture of carbon and two kinds of binders and coated on a base layer of said diffusion layer at a temperature near a melting temperature of one of said two kinds of binders.

34. (Currently amended) A ~~diffusion layer for a fuel cell comprising:~~
~~a base layer; and~~
~~a water repellent layer coated on said base layer, said water repellent layer being made from a mixture of carbon and synthetic resin and solidified~~

The diffusion layer according to claim 4, said synthetic resin being deformed into filaments by applying a shear force to said mixture before coating of said mixture onto said base layer.

35. (Withdrawn) A method for manufacturing a diffusion layer for a fuel cell comprising the steps of:

applying a shear force to a paste including carbon and synthetic resin;
coating said paste on a base layer of said diffusion layer; and
solidifying said paste coated on said base layer at a temperature near a melting temperature of said synthetic resin.

36. (Withdrawn) An apparatus for manufacturing a diffusion layer for a fuel cell comprising:

a mixer for applying a shear force to a paste including carbon and synthetic resin;
a coating device for coating said paste on a base layer of said diffusion layer;
and

a furnace for solidifying said paste coated on said base layer at a temperature near a melting temperature of said synthetic resin.

37. (Currently amended) A ~~diffusion layer for a fuel cell comprising:~~
~~a base layer; and~~
~~a water repellent layer coated on said base layer, said water repellent layer being made from a mixture of carbon and synthetic resin and solidified~~
The diffusion layer according to claim 4, said synthetic resin being deformed into filaments by applying a shear force to said water-repellent layer after solidifying said water-repellent layer.

38. (Withdrawn) A method for manufacturing a diffusion layer for a fuel cell comprising the steps of:

coating a paste for a water-repellent layer on a base layer of said diffusion layer, said paste including carbon and synthetic resin;

solidifying said paste coated on said base layer at a temperature near a melting temperature of said synthetic resin, and

applying a shear force to said water-repellent layer by causing said base layer and said water-repellent layer to pass between a pair of rollers which generate a stress directed in a width direction of said base layer in said water-repellent layer.

39. (Withdrawn) An apparatus for manufacturing a diffusion layer for a fuel cell comprising:

a coating device for coating a paste including carbon and synthetic resin on a base layer of said diffusion layer;

a furnace for solidifying said paste coated on said base layer at a temperature near a melting temperature of said synthetic resin; and

a pair of rollers for applying a shear force to the paste solidified when said solidified paste and said base layer are caused to pass between said pair of rollers.